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PTO/SB/08A (07-05)

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Substitute for form 1449/PTO

Complete if Known

Application Number	10/802,160
Filing Date	03/17/2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	1775
Examiner Name	Stephen J. Stein

Sheet 1 of 13

Attorney Docket Number 1075-BI4309

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
TMS	A1	US- 3,753,775	08/21/1973	Robinson et al.	
	B1	US- 3,964,942	06/22/1976	Berkenblit et al.	
	C1	US- 4,649,070	03/10/1987	Kondo et al.	
	D1	US- 4,657,754	04/14/1987	Bauer et al.	
	E1	US- 5,643,044	07/01/1997	Lund	
	F1	US- 5,742,026	04/21/1998	Dickinson, Jr. et al.	
	G1	US- 5,989,301	11/23/1999	Laconto, Sr. et al.	
	H1	US- 6,048,577	04/11/2000	Garg	
	I1	US- 6,238,450 B1	05/29/2001	Garg et al.	
	J1	US- 6,258,137 B1	07/10/2001	Garg et al.	
	K1	US- 6,265,089 B1	07/24/2001	Fatemi et al.	
	L1	US- 6,364,920 B1	04/02/2002	Garg et al.	
	M1	US- 6,391,072 B1	05/21/2002	Garg	
	N1	US- 6,406,769 B1	06/18/2002	Delabre	
	O1	US- 6,418,921 B1	07/16/2002	Schmid et al.	
	P1	US- 2001/0026950 A1	10/04/2001	Sunakawa et al.	
	Q1	US- 2002/0028314 A1	03/07/2002	Tischler et al.	
✓	R1	US- 2002/0030194 A1	03/14/2002	Camras et al.	
TMS	S1	US- 2003/0190770 A1	10/09/2003	Yeom et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ³
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				
TMS	T1	CN 1291795	04/18/2001	Guanglei Sci & Tech Co. Ltd.	English Abstract Only	
	U1	CN 1379484	11/13/2002	Univ Qinghua	English Abstract Only	
	V1	CN 1469459	01/21/2004	Fudi Elect. Mat. Co. Ltd.	English Abstract Only	
✓	W1	CN 1476046	02/18/2004	Shanghai Prec. Opt. Instr	English Abstract Only	
✓	X1	CN 1476047	02/18/2004	Shanghai Prec. Opt. Instr	English Abstract Only	
TMS	Y1	EP 997445	05/03/2000	Corning Inc.	English Abstract Only	

Examiner Signature	<i>Jennifer Stone</i>	Date Considered	06/06
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2

of 13

Complete if Known

Application Number	10/802,160
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First Named Inventor	Jennifer Stone-Sundberg
Art Unit	1775
Examiner Name	Stephen J. Stein

Attorney Docket Number 1075-BI4309

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		Number-Kind Code ² (<i>If known</i>)			
TMS	A2	US- 2003/0213950 A1	11/20/2003	Hwang	
TMS	B2	US- 2004/0063236 A1	04/01/2004	Kwak et al.	
TMS	C2	US- 2004/0089220 A1	05/13/2004	Kokta et al.	
	D2	US-			
	E2	US-			
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	O2	US-			
	P2	US-			
	Q2	US-			
	R2	US-			
	S2	US-			

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		Country Code ⁴ -Number ⁵ -Kind Code ⁶ (<i>If known</i>)				
TMS	T2	EP 1298709	04/02/2003	NGK Insulators Ltd.	English Abstract Only	
	U2	EP 1394867	03/03/2004	Samsung Elect. Co. Ltd.	English Abstract Only	
	V2	JP 53-043481	04/19/1978	Matsushita Elec Ind. Co. Ltd.	English Abstract Only	
	W2	JP 79-026873	09/06/1979	Nippon Elect. Co.	English Abstract Only	
↓	X2	JP 58-090736	05/30/1983	Tokyo Shibaura Elect. Co.	English Abstract Only	
TMS	Y2	JP 61-142759	06/30/1986	NGK Spark Plug Co. Ltd.	English Abstract Only	

Examiner Signature	<i>[Signature]</i>	Date Considered	06/06
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		First Named Inventor	Jennifer Stone-Sundberg
		Art Unit	1775
		Examiner Name	Stephen J. Stein
		Attorney Docket Number	1075-BI4309

Sheet 13 of 13

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Number-Kind Code ² (<i>if known</i>)					
A3	US-				
B3	US-				
C3	US-				
D3	US-				
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J3	US-				
K3	US-				
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M3	US-				
N3	US-				
O3	US-				
P3	US-				
Q3	US-				
R3	US-				
S3	US-				

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Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear
Country Code ³ -Number ⁴ Kind Code ⁵ (<i>if known</i>)					
TMS	T3	JP 62-123059	06/04/1987	Narumi Seito KK	English Abstract Only
	U3	JP 7-235692	09/05/1995	Sony Corp.	English Abstract Only
	V3	JP 8-040797	02/13/1996	Kyocera Corp.	English Abstract Only
	W3	JP 8-083802	03/26/1996	Shingijutsu Kigyodan	English Abstract Only
	X3	JP 8-095233	04/12/1996	Tono Seiki YG	English Abstract Only
	Y3	JP 9-129651	05/16/1997	Hewlett-Packard Co.	English Abstract Only

Examiner Signature	<i>[Signature]</i>	Date Considered	06/06/06
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(Use as many sheets as necessary)

Sheet 4

of 13

Application Number	10/802,160
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First Named Inventor	Jennifer Stone-Sundberg
Art Unit	1775
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		Number-Kind Code ² (<i>if known</i>)			
A4	US-				
B4	US-				
C4	US-				
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M4	US-				
N4	US-				
O4	US-				
P4	US-				
Q4	US-				
R4	US-				
S4	US-				

FOREIGN PATENT DOCUMENTS

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		Country Code ³ -Number ⁴ -Kind Code ⁵ (<i>if known</i>)				
T4	JP 9-129928		05/16/1997	Toshiba KK	English Abstract Only	
U4	JP 11-195813		07/21/1999	Toshiba Densi Eng. KK	English Abstract Only	
V4	JP 11-235659		08/31/1999	Ricoh KK	English Abstract Only	
W4	JP 11-274559		10/08/1999	Sanyo Elect. Co. Ltd.	English Abstract Only	
X4	JP 2000-228367		08/15/2000	Samsung Elect. Co. Ltd.	English Abstract Only	
Y4	JP 2000-331940		11/30/2000	Sony Corp.	English Abstract Only	

Examiner Signature		Date Considered	06/10/06
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 5 of 13

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Application Number	10/802,160
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First Named Inventor	Jennifer Stone-Sundberg
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Examiner Name	Stephen J. Stein
Attorney Docket Number	1075-B14309

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	O5	US-			
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	Q5	US-			
	R5	US-			
	S5	US-			

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		Country Code ³ -Number ⁴ -Kind Code ⁵ (<i>if known</i>)				
TMS	T5	JP 2001-010898	01/16/2001	NEC Corp.	English Abstract Only	
	US	JP 2001-198808	07/24/2001	Morioka Seiko Kogyo KK	English Abstract Only	
	V5	JP 2001-220295	08/14/2001	Namiki Seimitsu Hoseki KK	English Abstract Only	
	W5	JP 2001-253800	09/18/2001	Namiki Seimitsu Hoseki KK	English Abstract Only	
	X5	JP 2002-012856	01/15/2002	Neos KK	English Abstract Only	
TMS	Y5	JP 2002-050577	02/15/2002	Namiki Seimitsu Hoseki KK	English Abstract Only	

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Sheet 16 of 13

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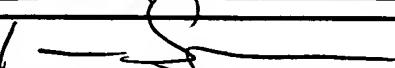
Application Number	10/802,160
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Attorney Docket Number	I075-BI4309

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O6	US-				
P6	US-				
Q6	US-				
R6	US-				
S6	US-				

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		Country Code ³ -Number ⁴ -Kind Code ⁵ (<i>if known</i>)				
TMP	T6	JP 2002-158377	05/31/2002	Matsushita Denki Sangyo KK	English Abstract Only	
	U6	JP 2002-255694	09/11/2002	Kyocera Corp.	English Abstract Only	
	V6	JP 2002-353425	12/06/2002	Kyocera Corp.	English Abstract Only	
	W6	JP 2003-045829	02/14/2003	Hitachi Chem Co. Ltd.	English Abstract Only	
	X6	JP 2003-113000	04/18/2003	Hitachi Cable Ltd.	English Abstract Only	
MAC	Y6	JP 2003-124151	04/25/2003	Disco KK	English Abstract Only	

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J7	US-				
K7	US-				
L7	US-				
M7	US-				
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O7	US-				
P7	US-				
Q7	US-				
R7	US-				
S7	US-				

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TMS	T7	JP 2003-165042	06/10/2003	Okamoto Kosaku Kikai Seisakusho KK	English Abstract Only	
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	V7	JP 2003-320521	11/11/2003	Tokyo Tungsten KK	English Abstract Only	
	W7	JP 2003-334754	11/25/2003	Nippon Microcoating KK	English Abstract Only	
	X7	JP 2003-338638	11/28/2003	Nichia Kagaku Kogyo KK	English Abstract Only	
TMS	Y7	JP 2004-006867	01/08/2004	Matsushita Denki Sagyo KK	English Abstract Only	

Examiner Signature		Date Considered	06/06
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Complete if Known**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Use as many sheets as necessary)

Sheet 8

of 13

Application Number	10/802,160
Filing Date	03/17/2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	1775
Examiner Name	Stephen J. Stein
Attorney Docket Number	I075-BI4309

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
A8	US-				
B8	US-				
C8	US-				
D8	US-				
E8	US-				
F8	US-				
G8	US-				
H8	US-				
I8	US-				
J8	US-				
K8	US-				
L8	US-				
M8	US-				
N8	US-				
O8	US-				
P8	US-				
Q8	US-				
R8	US-				
S8	US-				

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁴
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				
TMS	T8	JP 2004-014691	01/15/2004	Mitsubishi Gas Chem Co Inc.	English Abstract Only	
	U8	JP 2004-140394	05/13/2004	Nissan Chem Ind. Ltd.	English Abstract Only	
	V8	KR 2002-043128	06/08/2002	Ulsan College	English Abstract Only	
	W8	SU 1781271	12/15/1992	Krasny Poly (Kypo)	English Abstract Only	
	X8	TW 550836	09/01/2003	Ind. Tech. Res. Inst.	English Abstract Only	
TMS	Y8	WO 2000/68332	11/16/2000	MPM Ltd.	English Abstract Only	

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Sheet	9	Filing Date	03/17/2004	
	of 13	First Named Inventor	Jennifer Stone-Sundberg	
		Art Unit	1775	
		Examiner Name	Stephen J. Stein	
		Attorney Docket Number		1075-BI4309

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A9	US-				
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F9	US-				
G9	US-				
H9	US-				
I9	US-				
J9	US-				
K9	US-				
L9	US-				
M9	US-				
N9	US-				
O9	US-				
P9	US-				
Q9	US-				
R9	US-				
S9	US-				

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Country Code ³ -Number ⁴ -Kind Code ⁵ (<i>if known</i>)					
T9	WO 2002/92674	11/21/2002	US Sec of Navy	English Abstract Only	
U9	WO 2004/33769	04/22/2004	Unisearch Ltd.	English Abstract Only	
V9				English Abstract Only	
W9				English Abstract Only	
X9				English Abstract Only	
Y9				English Abstract Only	

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(Use as many sheets as necessary)				
Sheet	10	of	13	Attorney Docket Number
1075-BI4309				

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
MS	A10	Aeschlimann, R. et al., "The Chemical Polishing of Magnesium Aluminate Spinel in Pyrophosphoric Acid", MAT. RES. BULL., Vol. 5, pgs 167-172, 1970.	
	B10	Dwikusuma, F., "Study on Sapphire Surface Preparation for III-Nitride Heteroepitaxial Growth by Chemical Treatments", JOURNAL FOR ELECTROCHEMICAL SOC., Nov. 2002, 30 pgs.	
	C10	Kim, S. et al., "Stress Relaxation in Thick-Film GaN Grown by Hydride Vapor Phase Epitaxy on Sapphire and Spinel Substrates as Studied by Photoluminescence and Raman Spectroscopy", J. OF THE KR PHYS SOC., Vol. 34, No. 2, Feb. 1999, pgs 163-167.	
	D10	Kurobe, Toshiji, et al., "Magnetic Field-Assisted Lapping", BULL. JAPAN SOC. OF PREC. ENGG., Vol. 20, No. 1, March 1986, pgs 49-51.	
	E10	Libowitzky, E., "Optical Anisotropy in the Spinel Group: a Polishing Effect", EUR. J. MINERAL., Vol. 6, 1994, pgs. 187-194.	
	F10	Reisman, A., et al., "The Chemical Polishing of Sapphire and MgAl Spinel", J. ELECTROCHEM. SOC.: SOLID STATE SCIENCE, Vol. 118, No. 10, October 1971, pgs 1653-1657.	
	G10	Richter, F., et al., "Herstellung und Aurichtung Von MgAl-Spinell-Substraten fur die Halbleiterpitaxie", KRISTALL UND TECHNIK, Vol. 10, No. 3, 1975, pgs 33-348.	
	H10	Robinson, P., et al., "The Chemical Polishing of Sapphire and Spinel", RCA REVIEW, Vol. 34, December 1973, pgs 616-629.	
↓	I10	Roy, D., et al., "Spinel, Where did it go?", SPIE Vol. 3134, pgs 307-316.	
MS	J10	Wang, C., et al., "Growth and Characterization of Spinel Single Crystal for Substrate Use in Integrated Electronics", J. APPLIED PHYSICS, Vol. 40, No. 9, August 1969, pgs 3433-3444.	

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				Application Number	10/802,160
				Filing Date	03/17/2004
				First Named Inventor	Jennifer Stone-Sundberg
				Art Unit	1775
				Examiner Name	Stephen J. Stein
Sheet	11	of	13	Attorney Docket Number	1075-BI4309

NON PATENT LITERATURE DOCUMENTS				
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		
TMS	A11	Yanina, S., et al., "Moving Steps and Crystal Defects on Spinel Surfaces", MAT. RES: SOC. SYMP., Vol. 620, 2000, pgs M9.4.1-M9.4.6.		T ²
	B11	Byun, D., et al., "Reactive ion (N2+) Beam Pretreatment of Sapphire for GaN Growth", THIN SOLID FILMS, Vol. 326, 1998, pgs 151-153.		
	C11	Byun, D., et al., "New Pretreatment Method of Sapphire for GaN Deposition", PHYS. STAT. SOL., Vol. 176, 1999, pgs 643-648.		
	D11	Sung, Y., et al., "High Rate Etching of Sapphire Wafer Using Cl2BCl3Ar Inductively Coupled Plasmas", MAT. SCI. & ENG.: SOLID STATE MAT, Vol. B82, No. 1-3 2000, pgs 50-52. (ABSTRACT ONLY)		
	E11	Wang, X., et al., "Chemical Polishing of Sapphire for Growth of GaN", CHINESE JOURNAL OF SEMICONDUCTORS, Vol. 18, No. 11, pgs 867-871, 1997. (ABSTRACT ONLY)		
	F11	Lee, J., et al., "Scribing and Cutting a Blue LED Wafer Using a Q-Switched Nd:YAG Laser", APPLIED PHYSICS, Vol. 70, No. 5, pgs 561-564, 2000. (ABSTRACT ONLY)		
	G11	Kalinski, Z., "Preparation of Sapphire Substrates for Gas Phase GaN Epitaxial Processes", KRISTAL UND TECHNIK, Vol. 12, No. 10, pgs 1105-1110, 1977. (ABSTRACT ONLY)		
	H11	Jeong, C., et al., "Sapphire Etching with BCl3/HBr/Ar Plasma", SURFACE & COATINGS TECHNOLOGY, Vol. 171, No. 1-3, 2003, pgs 280-284. (ABSTRACT ONLY)		
	I11	Kalinski, Z., et al., "Structural Etching of Al2O3 Substrate Plates Applied in Gaseous Epitaxy of GaN Layers", ELEKTRONIKA, Vol. 18, No. 3, 1977, pgs 117-119. (ABSTRACT ONLY)		
TMS	J11	Lakew, B., et al., "High Tc Superconducting Bolometer on Chemically Etched 7 Micrometer Thick Sapphire", NASA, 1997, 21 pgs. (ABSTRACT ONLY)		

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				First Named Inventor	Jennifer Stone-Sundberg
				Art Unit	1775
				Examiner Name	Stephen J. Stein
Sheet	12	of	13	Attorney Docket Number	1075-BI4309

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TMS	A12	Jeong, C., et al., "Dry Etching of Sapphiure Substrate for Device Separation in Chlorine-Based Inductively Coupled Plasmas", MAT. SCI. & ENG.: SOLID STATE MATERIALS, Vol. 93, No. 1-3, pgs 60-63, 2002. (ABSTRACT ONLY)				
	B12	Gu, E., et al., "Micromachining and Dicing of Sapphire, Gallium Nitride and Micro LED Devices with UV Copper Vapour Laser", THIN SOLID FILMS, Vol. 453-454, pgs 462-466, 2000. (ABSTRACT ONLY)				
	C12	Park, H., et al., "A Novel Process for the Generation of Pristine Saphire Surfaces", THIN SOLID FILMS, Vol. 422, No. 1-2, pgs 135-140, 2000. (ABSTRACT ONLY)				
	D12	Fenner, D., et al., "Ion Beam Nanosmoothing of Sapphire and Silicon Carbide Surfaces", SPIE, Vol. 4468, pgs 17-24, 2001. (ABSTRACT ONLY)				
	E12	Blecha, Z., et al., "On Fabrication of Sapphire Substrates (1102) for Epitaxy of Monocrystalline Silicon", JEMNA MECHANika A OPTIKA, Vol. 28, No. 12, pgs 249-351, 1983. (ABSTRACT ONLY)				
	F12	Duffy, M., et al., "Optical Characterization of Silicon and Sapphire Surfaces as related to SOS Discrete Device Performance", JOURNAL OF CRYSTAL GROWTH, Vol. 58, No. 1, pgs 19-36, 1982. (ABSTRACT ONLY)				
	G12	Ehman, M., et al., "Mechanical Preparation of Sapphire Single-Crystal Surfaces by Vibratory Techniques", METALLOGRAPHY, Vol. 9, No. 4, pgs 333-339, 1976. (ABSTRACT ONLY)				
	H12	Druminiski, M., et al., "Deposition of Epitaxial Films on Spinel and Sapphire. Influence of Substrate Preparation", SIEMENS FORSCHUNGS - UND ENTWICKLUNGSBERICHTE, Vol. 5, No. 3, pgs 139-145, 1976. (ABSTRACT ONLY)				
	I12	Cullen, G., "The Preparation and Properties of Chemically Vapor Deposited Silicon on Sapphire and Spinel", JOURNAL OF CRYSTAL GROWTH, Vol. 9, pgs 107-125, 1971. (ABSTRACT ONLY)				
TMS	J12	Liu, L., et al., "Substrates for Gallium Nitride Epitaxy", MAT. SCI. & ENG. REPORTS, Vol. R37, No. 3, pgs 61-127, 2000. (ABSTRACT ONLY)				

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Sheet	13	of	13	Attorney Docket Number	1075-BI4309

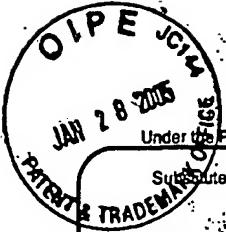
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TMS	A13	Khattak, C., et al., "Production of Sapphire Blanks and Substrates for Blue LEDs and LDs", MAT. RES. SOC. SYMP. - PROCEEDINGS, V. 743, pgs 219-224, 2002. (ABSTRACT ONLY)	
	B13	Gutsche, H., et al., "Polishing of Sapphire with Colloidal Silica", JOURNAL OF THE ELECTROCHEMICAL SOCIETY, Vol. 125, No. 1, 1978, pgs 136-138, 1978. (ABSTRACT ONLY)	
	C13	Duffy, M., et al., "Semiconductor Measurement Technology: Method to Determine the Quality of Sapphire, (NOTE) Final Report", RCA Labs, 1980, 77 pgs. (ABSTRACT ONLY)	
	D13	Duffy, M., et al., "Method to Determine Qulity of Sapphire, (NOTE) Interim Rept.", RCA Labs, 1975, 88 pgs. (ABSTRACT ONLY)	
	E13	Horie, S., et al., "Precision Grinding of Semiconductor - Related Materials", (JOURNAL) NEW DIAMOND, Vol. 20, No. 2, pgs 8-13, 2004. (ABSTRACT ONLY)	
	F13	Edgar, J., et al., "Substrates for Gallium Nitride Epitaxy", MAT. SCI. & ENG., PART R, Vol. R37, No. 3, pgs 61-127, 2002. (ABSTRACT ONLY)	
✓	G13	Author Unkown, "Specifications for Polished Monocrystalline Sapphire Substrates" 1996, Affiliation (Issuing Organization) SEMI Semiconductor Equipment & Materials International, USA. (Bibliographic Entry Only).	
TMS	H13	Search Report for Technical Articles (Including various Abstracts of certain Identified References)	
	I13		
	J13		

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PTO/SB/08A (08-03)

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Sheet 1

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Filing Date	March 17, 2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	2812
Examiner Name	UNASSIGNED
Attorney Docket Number	1035-BI4309

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TMS	AA	US- 4,963,520	10/16/1990	Yoo, et al.	
	AB	US- 5,982,796	11/09/1999	Kokta, et al.	
	AC	US- 5,654,973	08/05/1997	Stultz, et al.	
	AD	US- 5,557,624	09/17/1996	Stultz, et al.	
	AE	US- 6,366,596	04/02/2002	Yin, et al.	
TMS	AF	US- 6,023,479	02/08/2000	Thony, et al.	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet

2

of

3

Complete If Known

Application Number	10/802,160
Filing Date	March 17, 2004
First Named Inventor	Jennifer Stone-Sundberg
Art Unit	2812
Examiner Name	UNASSIGNED
Attorney Docket Number	1035-BI4309

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
MS	BA	Efimov, A.N., et al., "On an Unusual Azimuthal Orientation Relationship in the System Gallium Nitride Layer on Spinel Substrate", CRYSTALLOGRAPHY REPORTS, 45(2): 312-317 (2000).	
	BB	Sun C.J., et al., "Mg-doped green light emitting diodes over cubic (1 1 1) MgAl2O4 substrate", APP. PHYS. LETT. 72(19): 2361-2363 (1998).	
	BC	Efimov, A.N., et al., "Symmetry constraints and epitaxial growth on non-isomorphic substrate", THIN SOLID FILMS 260: 111-117 (1995).	
	BD	George, T., et al., "Novel symmetry in the growth of gallium nitride on magnesium aluminate substrates", APPL. PHYS. LETT. 68(3): 337-339 (1996).	
	BE	Sun C.J., et al., "Deposition of high quality wurtzite GaN films over cubic (1 1 1) MgAl2O4 substrates using low pressure and metalorganic chemical vapor deposition," APPL. PHYS. LETT. 68(8): 1129-1131 (1996).	
	BF	Nakamura, S., et al., "Characteristics of InGaN multi-quantum-well-structure laser diodes," APPL. PHYS. LETT. 68(23): 3269-3271 (1996).	
	BG	Khan, M.A., et al., "Cleaved cavity optically pumped InGaN-GaN laser grown on spinel substrates," APPL. PHYS. LETT. 69(16): 2418-2420 (1996).	
	BH	Tempel, A., et al., "Nachweis von Stapelfehlern in GaN-Exitaxieschichten mittels Elektronenbeugung," KRISTALL UND TECHNIK 10(7): 741-746 (1975).	
	BI	Tempel, A., et al., "Zur Epitaxie von Galliumnitrid auf nichtstoechiometrischem Spinell im System GaC1/NH3/He," KRISTALL UND TECHNIK 10(7): 747-758 (1975)	
MS	BJ	K.V. Yumashev, "Saturable absorber Co ²⁺ : MgAl ₂ O ₃ crystal for Q switching of 1.34-μm Nd ³⁺ : YAlO ₃ and 1.54-μm Er ³⁺ : glass lasers," APPLIED OPTICS 38(30): 6343-6346 (1999).	

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Date Considered

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First Named Inventor

Jennifer Stone-Sundberg

Art Unit

2812

Examiner Name

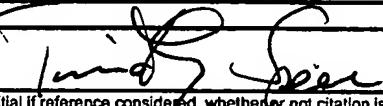
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MJS	CA	Camargo, M.B., et al., "Co2+ Y3Sc2Ga3O12 (YSGG) Passive Q-Switch for Infared Erbium Lasers," submitted to LEOS in 1994.	
	CB	Mikhailov, V.P., et al., "Passive Q-switch performance at 1.3u (1.5u) and nonlinear spectroscopy of Co2+: MgAl2O4 and Co2+: LaMgAl11O9 cyrstals," OSA TOPS VOL. 26 Advanced Solid-State Lasers, pp. 317-324 (1999).	
	CC	Stulz, R.D., et al., "Diavalent Uranium and Cobalt Saturable Absorber Q-Switches at 1.5um," OSA Proceedings on Advanced Solid-State Lasers, 24:460-464 (1995).	
	CD	Bimbaum, M., et al., " Co2+: ZnSe Saturable Absorber Q-Switch for the 1.54 Um Er3+: Yb3+: Glass Laser," OSA TOPS Vol. 10 Advanced Solid State Lasers, pp. 148-151 (1997).	
	CE	Machida, H., et al., "difficulties encountered during the Czochralski growth of TiO2 single crystals," JOURNAL OF CYRSTAL GROWTH, 112: 835-837 (1997).	
	CF	Camargo, M.B., et al., "Broad-band 1.54 um Saturable Absorber Q-switch with Co2+, " submitted to ASSL in 1995.	
	CG	Yumashev, K.V., et al., "Nonlinear spectroscopy and passive Q-switching operation of a Co2+: LaMgAl11O19 crystal," J. OPT. SOC. AM. B., 16(12): 2189-2194 (1999).	
	CH		
U	CI		
MJS	CJ		

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Art Unit	2812
Examiner Name	UNASSIGNED

Attorney Docket Number 1035-BI4309

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
TMS	AA	US-3,625,868	12/07/1971	Grabmaier et al.	
	AB	US-3,736,158	05/29/1973	Cullen et al.	
	AC	US-3,816,906	06/18/1974	Falckenberg	
	AD	US-3,883,313	05/13/1975	Cullen et al.	
	AE	US-3,885,978	05/27/1975	Doi et al.	
	AF	US-3,990,902	11/09/1976	Nishizawa, et al.	
	AG	US-3,950,504	04/13/1976	Belding et al.	
	AH	US-4,370,739	01/25/1983	Wang et al.	
	AI	US-4,755,314	07/05/1988	Sakaguchi et al.	
	AJ	US-5,138,298	08/11/1992	Shino	
	AK	US-5,850,410	12/15/1998	Kuramata	
	AL	US-6,533,874 B1	03/18/2003	Vaudo et al.	
	AM	US-2003/0188678 A1	10/09/2003	Kokta et al.	
	AN	US-6,839,362 B2	01/05/2005	Kokta et al.	
	AO	US-6,844,084 B2	01/18/2005	Kokta et al.	
TMS	AP	US-3,424,955	01/28/1969	Seiter et al.	
	AQ	US-			
	AR	US-			
	AS	US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T ⁶
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				
TMS	AT	FR 1,471,976	03/24/1966	Siemens Aktiengesellsc.	Corr. 3,424,955	
	AU	JP 11-157997	06/15/1999	Kyocera Corporation	Abstract Only	
	AV	JP 09-278595	10/28/1997	Sumitomo Elect. Ind. Ltd.	Abstract Only	
	AW	JP 62-188325	08/17/1987	Sumitomo Elect. Ind. Ltd.	Abstract Only	
	AX	JP 58-211736	12/09/1983	Toshiba Corporation	Abstract Only	
TMS	AY	JP 07-307316	11/21/1995	Sumitomo Elect. Ind. Ltd.	Abstract Only	

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Sheet 2 of 3

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Application Number	10/802,160
Filing Date	March 17, 2004
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Art Unit	2812
Examiner Name	UNASSIGNED
Attorney Docket Number	1035-BI4309

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DMC	BT	EP 0 762 930 B1	07/12/2000	BP Amoco Corporation		
BU	EP 0 263 171 B1		11/25/1992	UOP		
↓	BV	WO 01/99155 A2	12/27/2001	Nichia Corporation		
PMR	BW	WO 02/95887 A2	11/28/2002	SG Ceramics & Plastics Inc.		
	BX					
	BY					

Examiner Signature	<i>John S. Peen</i>	Date Considered	06/06
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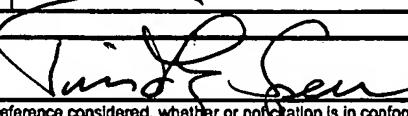
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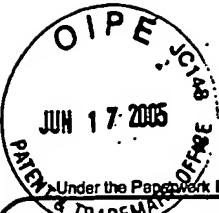
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<i>MJS</i>	CA	Giess et al., "Growth of Single Crystal MgGa ₂ O ₄ Spinel", IBM TECHNICAL DISCLOSURE BULLETIN, Vol. 15, no. 1, June 1972, pgs 151-152, XP-002315746.	
	CB	Anon., "Spinel Crystals for Electronic Devices", MANUFACTURING TECHNOLOGY NOTE, Vol. NTN-77, no. 0735, April 1977, XP-002315747.	
	CC	Grabmaier et al., "Czochralski Growth of Magnesium-Aluminum Spinel", J. AMERICAN CERAMIC SOCIETY, Vol. 51, no. 6, June 1968, pgs 355-356, XP-002315185.	
	CD	Wyon et al., "Czochralski Growth and Optical Properties of Magnesium-Aluminum Spinel Doped with Nickel", JOURNAL OF CRYSTAL GROWTH, NORTH-HOLLAND PUBLISHING CO. AMSTERDAM, NL, Vol. 79, no. 1-3, part 2, 1986, pgs 710-713, XP-002250057.	
	CE	Pinckney, L.R., "Transparent, high strai point spinel glass-ceramics", JOURNAL OF NON-CRYSTALLINE SOLIDS, Vol. 255, pp. 171-177, 1999.	
	CF	Nakamura, S. "Current Status and Furture Prospects of InGaN-Based Laser Diodes", ISAP INTERNATIONAL, Vol. 1, pgs. 5-17, 2000.	
	CG	Kisailius D., et al., "Growth of Epitaxial GaN on LiGaO ₂ Substrates Via a Reaction With Ammonia", J. MATER. RES., Vol. 16, no. 7, pgs 2077-2081, 2001.	
<i>CH</i>	CH	Nakamura, S., et al., "InGaN MQW LDs Grown on MgAl ₂ O ₄ Substrates," In THE BLUE LASER DIODE, (NY: Springer-Verlag), pp. 233-243, 1997 (update included).	
<i>MJS</i>	CI	Mordoc, H., et al., "Large-band-gap SiC, III-V nitride, and II-vi ZnSe-based Semiconductor Device Technologies", J. APPL. PHYS., Vol. 76, no. 3, pgs 1363-1398, 1994.	
	CJ		

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Examiner Name	Unknown

Attorney Docket Number 1035-BI4309

U. S. PATENT DOCUMENTS

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		Number-Kind Code ² (if known)			
TMS	A	US- 3,808,065	04-30-1974	Robinson, et al.	
	B	US- 3,898,051	08-05-1975	Schmid	
↓	C	US- 4,347,210	08-31-1982	Maguire, et al.	
TMS	D	US- 5,968,267	10-19-1999	Li	
E	US-				
F	US-				
G	US-				
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First Named Inventor	Jennifer Stone-Sundberg
Art Unit	1775
Examiner Name	Stephen J. Stein

Attorney Docket Number 1075-BI4309

II. U.S. PATENT DOCUMENTS

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TM	A	US- 6,846,434 B2	01/25/2005	Aksetrod	
TM	B	US- RE38,489 E	04/06/2004	Thomy et al.	
	C	US-			
	D	US-			
	E	US-			
	F	US-			
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First Named Inventor Jennifer Stone-Sundberg
Attorney Docket Number 1035-BI4309

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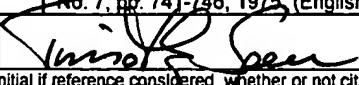
U.S. PATENT DOCUMENTS

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	AB	3,658,586		WANG	04/25/1972	
	AC	3,796,597		V.R. PORTER, et al.	03/12/1974	
	AD	4,177,321		NISHIZAWA	12/04/1979	
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TMS	AK	2003/0007520	A1	KOKTA, et al.	01/09/2003	

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TMS	AL	EP	0 148 656	A1	AUZEL, et al.	11/16/1984		<input type="checkbox"/>
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PUBLICATIONS

Examiner Initials *	Cite No.1	Title of Publication	Date of Publication of Cited Document MM-DD-YYYY
TMS	AV	YUMASHEV K.V., et al., "Co ²⁺ -doped spinels saturable absorber Q-switches for 1.3-1.6 μm solid state lasers", OSA TRENDS IN OPTICS AND PHOTONICS. ADVANCED SOLID STATE LASERS., Vol. 34, pp. 236-239, 2000. XP008017966	
	AW	YUMASHEV, K.V., et al., "Passive Q-switching of 1.34-m neodymium laser using Co ²⁺ :LiGa ₅ O ₈ and Co ²⁺ :MgAl ₂ O ₄ ", CONFERENCE DIGEST, 2000, 1 page. XP002242959	
	AX	OKTYABRSKY, S., et al., "Crystal structure and defects in nitrogen-deficient GaN", MRS Internet J. Nitride Semicond. Res, G6.43, pp. 1-6, 1999.	
	AY	KLEBER, W., et al., "Zur Epitaxie von Galliumnitrid auf nichtstochiometrischem Spinel im System GaCl/NH ₃ /He", CRYSTAL RESEARCH AND TECHNOLOGY, Vol. 10, No. 7, pp. 747-758, 1975. (English Abstract)	
TMS	AZ	SEIFERT, A., "Nachweis von Stapelfehlern in GaN-Epitaxieschichten mittels Elektronenbeugung", CRYSTAL RESEARCH AND TECHNOLOGY, Vol. 10, No. 7, pp. 741-746, 1975. (English Abstract)	
Examiner Signature			Date Considered <u>06/06</u>

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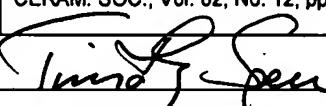
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TMS	BA	6,533,874	B1	VAUDO, et al.	03/18/2003	
	BB	4,627,064		AUZEL, et al.	12/02/1986	
	BC	4,000,977		FALCKENBERG	01/04/1977	
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	BL						<input type="checkbox"/>
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PUBLICATIONS

Examiner Initials *	Cite No.1	Title of Publication	Date of Publication of Cited Document MM-DD-YYYY
TMS	BW	OHSATO, H., et al., "Epitaxial orientation and a growth model of (0 0 · 1) GaN thin film on (1 1 1) spinel substrate", JOURNAL OF CRYSTAL GROWTH, Vol. 189/190, pp. 202-207, 1998.	
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✓	BY	DUAN, S., et al., "MOVPE growth of GaN and LED on (1 1 1) MgAl ₂ O ₄ ", JOURNAL OF CRYSTAL GROWTH, Vol. 189/190, pp. 197-201, 1998.	
TMS	BZ	SHELDON, R., et al., "Cation Disorder and Vacancy Distribution in Nonstoichiometric Magnesium Aluminate Spinel, MgO · Al ₂ O ₃ ", J. AM. CERAM. SOC., Vol. 82, No. 12, pp. 3293-3298, 1999.	
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Sheet 3 of 3

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PUBLICATIONS

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TMAS	AAA	KULESHOV, N.V., et al. "Co-doped spinels: promising materials for solid state lasers", LONGER WAVELENGTH LASERS AND APPLICATIONS, Vol. 2138, pp. 175-182, 1994. XP008017848	
	AAB	KULESHOV, N.V., et al., "Absorption and luminescence of tetrahedral Co ²⁺ ion in MgAl ₂ O ₄ , Vol. 55, no. 5-6, pp. 265-269, 1993. XP008017849	
	AAC	NIKISHIN, S.A., et al., "Gas source molecular beam epitaxy of GaN with hydrazine on spinel substrates", APPLIED PHYSICS LETTERS, Vol. 72, No. 19, pp. 2361-2363, 1998. XP000765983	
	AAD	HAISMA, et al., "Lattice constant adaptable crystallographics", JOURNAL OF CRYSTAL GROWTH, Vol. 102, pp. 979-993, 1990. XP002250056	
	AAE	TAMURA, K., et al., "Epitaxial growth of ZnO film on lattice-matched ScAlMgO ₄ (0001) substrates", JOURNAL OF CRYSTAL GROWTH, Vol. 214-215, pp. 59-62, 2000. XP004200964	
	AAF	WYON, et al., "Czochralski growth and optical properties of magnesium-aluminum spinel doped with nickel", JOURNAL OF CRYSTAL GROWTH, Vol. 79, pp. 710-713, 1986. XP002250057	
	AAG	TSUCHIYA, T., et al. "Epitaxial growth of InN films on MgAl ₂ O ₄ (1 1 1) substrates", JOURNAL OF CRYSTAL GROWTH, Vol. 220, pp. 185-190, 2000.	
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	AAI	MITCHELL, T., "Dislocations and Mechanical Properties of MgO- MgAl ₂ O ₃ spinel single crystals", J. AM. CERAM. SOC., Vol. 82, No. 12, pp. 3305-3316, 1999.	
	AAJ	HELLMAN, E., "Exotic and Mundane substrates for gallium nitride heteroepitaxy", BELL LABORATORIES, THC2, Murray Hill, NJ.	
	AAK	KRUGER, M.B., et al., "Equation of state of MgAl ₂ O ₄ spinel to 65 GPa", THE AMERICAN PHYSICAL SOCIETY, Vol. 58, No. 1, pp. 1-4, 1997.	
	AAL	KURAMATA, A., et al., "Properties of GaN epitaxial layer grown on (111) MgAl ₂ O ₄ substrate", SOLID-STATE ELECTRONICS, Vol. 41, No. 2, pp. 251-254, 1997.	
TMAS	AAM	GRITSYNA, V., et al., "Structure and Electronic states of defects in spinel of different compositions MgO • n MgAl ₂ O ₃ :Me", J. AM. CERAM. SOC. Vol. 82, No. 1, pp. 3365-3373, 1999.	
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